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Fresh-water Crabs of the Genus *Pseudothelphusa* from Rancho Grande, Venezuela.¹

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(Text-figures 1-3).

[This is one of a series of papers resulting from the 45th, 46th and 47th Expeditions of the Department of Tropical Research of the New York Zoological Society, made during 1945, 1946 and 1948 under the direction of Dr. William Beebe with headquarters at Rancho Grande in the National Park of Aragua, Venezuela. The expeditions were made possible through the generous cooperation of the National Government of Venezuela and of the Creole Petroleum Corporation.

[The characteristics of the research area are in brief as follows: Rancho Grande is located in north central Venezuela (10° 21' N. Lat., 67° 41' W. Long.), 80 kilometers west of Caracas, at an elevation of 1,100 meters in the undisturbed montane cloud forest which covers this part of the Caribbean range of the Andes. Adjacent ecological zones include seasonal forest, savanna, thorn woodland, cactus scrub, the fresh water Lake Valencia, and various marine littoral zones. The Rancho Grande area is generally subtropical, being uniformly cool and damp throughout the year because of the prevalence of the mountain cloud cap. The dry season extends from January into April. The average humidity during the expeditions, including parts of both wet and dry seasons, was 92.4%; the average temperature during the same period was 18° C.; the average annual rainfall over a 5-year period was 174 cm. The flora is marked by an abundance of mosses, ferns and epiphytes of many kinds, as well as a few gigantic trees. For further details, see Beebe & Crane, *Zoologica*, Vol. 32, No. 5, 1947. Unless otherwise stated, the specimens discussed in the present paper were taken in the montane cloud forest, within a radius of 1 kilometer of Rancho Grande.]

GENERAL ACCOUNT.

Two species of Potamonidae, both belonging to the genus *Pseudothelphusa*, live within the Rancho Grande area and are common near the laboratory at an altitude of about 3,500 feet. One, *P. garmani*, occurs also farther down, near stream-beds in semi-evergreen seasonal forest, at least to 2,000 feet. The other, the apparently new *P. chacei*, is confined to the cloud forest. Each occurs on both the Caribbean and Valencia sides of the Cordillera.

The general habits are similar in both. Each is occasionally found walking along the damp forest floor, at considerable distances from the small mountain torrents. More rarely the crabs are seen submerged in the streams themselves, clinging tightly to the rocks and moss with their spiny feet. In both species the young are carried principally during the dry season, in March and early April, three females with young having been taken during that season, as well as all of the very small free-living young in the collection. In contrast only one female taken during the rains, in June, carried young. The single female with spermatophores was captured in September; by inference the eggs are laid between October and February, the season during which we have not visited the laboratory.

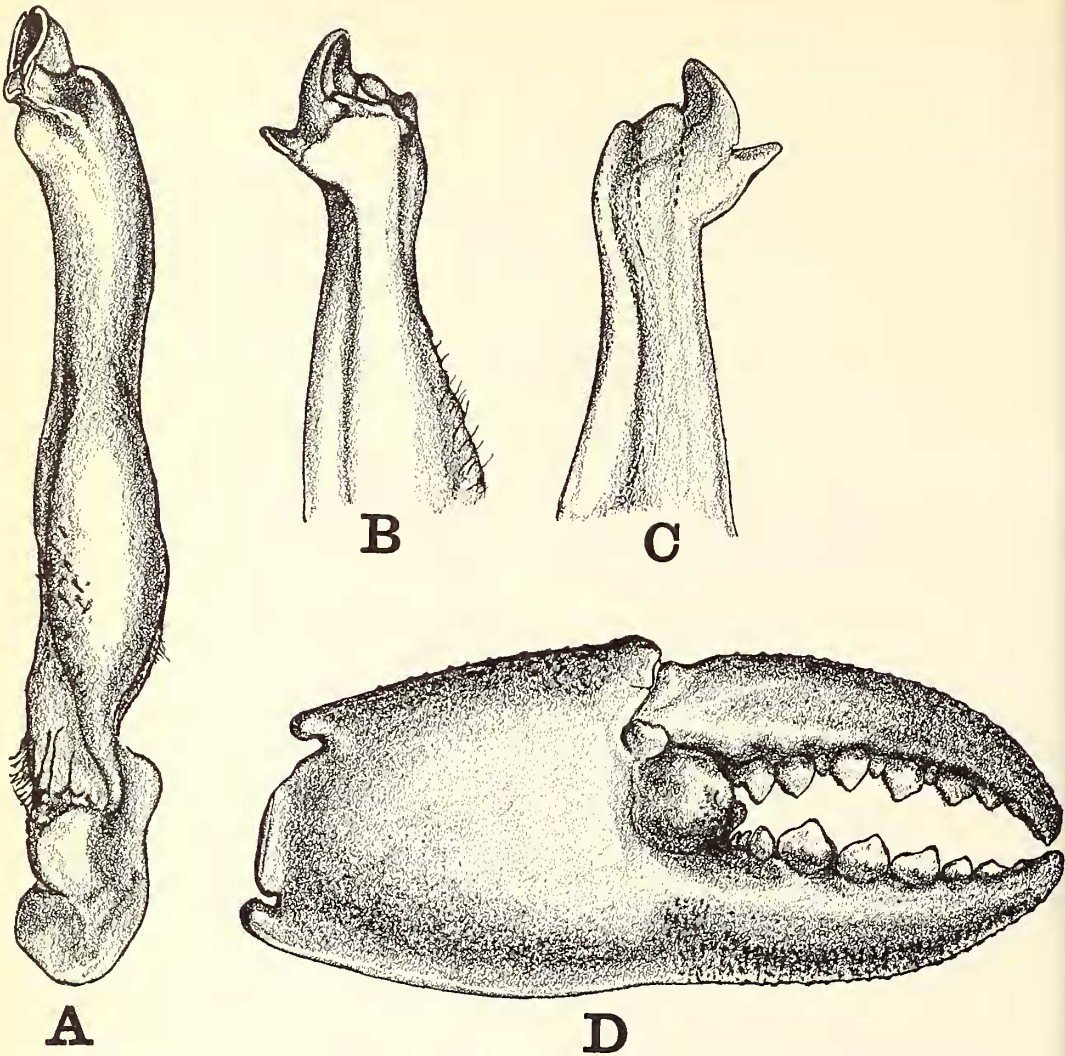
The food of both species consists largely of insects, especially beetles. The remains of eaten crabs are found frequently, and it seems certain that these crustaceans form an important food item in the diet of such local animals as tayras and opossums.

My sincere appreciation goes to Dr. Fenner A. Chace of the United States National Museum for his kindness in determining the identity of *P. garmani* and the systematic status of *P. chacei*. The specimens are in the collections of the Department of Tropical Research of the N. Y. Zoological Society, except for two examples of each species which have been deposited in the United States National Museum. Text-figs. 3A and 3B are the work of Miss Pamela Marmont; the remainder are by Miss Louise Moore.

Field Key to the Rancho Grande Species of *Pseudothelphusa*.

- A. Manus of cheliped with a large tubercle at base of fingers; anterior part of carapace slightly rough to touch; adults large, measuring at least three inches across, females 2¾ inches across still having narrow abdomens; marsupial young numbering between 200 and 300, their front distinctly bilobed and convex; semi-evergreen seasonal and cloud forests *garmani*

¹ Contribution No. 829, Department of Tropical Research, New York Zoological Society.



TEXT-FIG. 1. *Pseudothelphusa garmani*. Adult male, length 47 mm. **A**, right first abdominal appendage, extero-posterior view; **B**, same, extero-anterior view; **C**, same, postero-internal view; **D**, major cheliped, external view.

AA. Manus of cheliped without tubercle at base of fingers; anterior part of carapace smooth to touch; adults small, mature females measuring about $1\frac{1}{2}$ inches across, males less; marsupial young numbering between 20 and 40, their front scarcely lobed, truncate; cloud forest only *chacei*, sp. nov.

Pseudothelphusa garmani Rathbun, 1898.

(Text-fig. 1, 2A).

Reference. *Pseudothelphusa garmani* Rathbun, 1898, p. 522, text-fig. 14.

Color in life. Adults of both sexes: variable shades of dark brown; color of carapace uniformly distributed, the chelipeds, ambulatories and abdomen slightly lighter. Marsupial young: carapace dark brown anteriorly, paler behind; chelipeds apricot buff (Ridgway), deepest on upper merus, carpus and upper half of manus; chelae creamy or white;

sides of carapace light brown to buff; sternum and abdomen white; ischium and trochanter of ambulatories buff, other segments dark brown.

Development. Two females carried 258 and 260 young, respectively. An example, illustrated in Text-fig. 2A, measures 3.5 mm. in length, 4.7 in breadth. The general form is closely similar to that of the adult, but the front has each of the two distinct lobes more convex and there is no trace of a tubercle outside the manus at the base of the fingers; manus not swollen. No very small free-living examples of this species were taken, but a young female 29 mm. long has the tubercle distinct.

Food. Three large examples all contained comminuted black chitin, showing in one case unmistakable beetle elytra; in addition one stomach held soft animal matter, probably worm tissue.

Habitat and Range. Taken at Rancho Grande from semi-evergreen seasonal and cloud forests, between 2,000 and 3,800 feet. Previously known also from near Caracas, Venezuela, and from Trinidad.

Material. A total of six specimens, not counting marsupial young, have been preserved. Department of Tropical Research Cat. Nos. 4635, male, length 47 mm.; cloud forest, Mar. 28, 1946; 4626, female, 55 mm., Rancho Grande verandah, June 24, 1946, with 260 marsupial young, No. 4626a; No. 45449, 2 immature females, 29, 42.5 mm., cloud forest, April 1, 1945. U. S. Nat. Mus. Nos. 82379, male, length 38.5, cloud forest, Mar. 18, 1946; 82380, female, with spermatophores, length 42.5, semi-evergreen seasonal forest (2000 feet), Sept. 6, 1946.

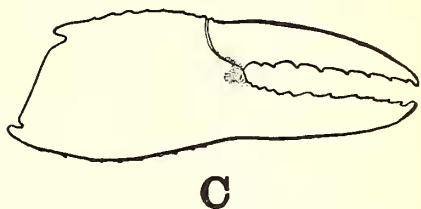
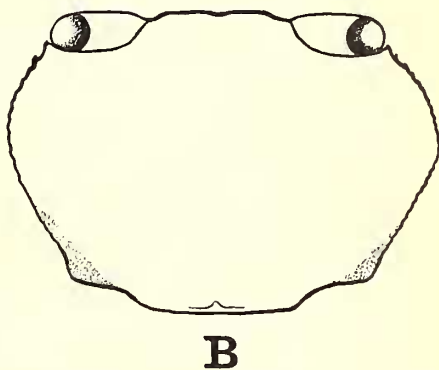
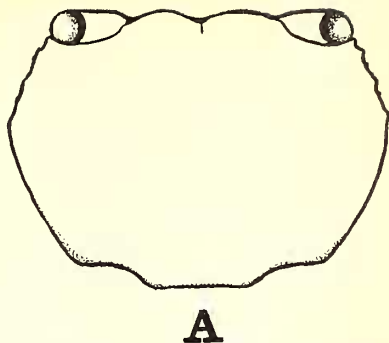
Pseudothelphusa chacei sp. nov.

(Text-figs. 2B, 2C, 3).

Diagnosis: Superior margin of front distinct and tuberculate but not carinate; bilobed, with median suture present; cervical suture nearly straight; carapace scarcely convex, smooth; exognath of maxillipeds reduced to a stump; manus somewhat swollen; no tubercle at base of fingers; front low; male matures at length of 17 mm., female at about 23.

Description. Carapace slightly convex, regions scarcely elevated; gastric region slightly less elevated than branchial; anterior margins of protogastric lobes distinct but not prominent; depressions defining anterior part of mesogastric region scarcely indicated; median furrow less well defined than in *garmani*; cervical groove nearly straight, deep, continued practically to lateral margin. Carapace almost completely smooth to the touch, with only a hint of microscopically fine granules in antero-lateral regions. Antero-lateral margins with a small orbital tooth followed by a slight gap; behind this are about 23 to 25 fine teeth, similar and close-set. Front low; superior margin distinct but not carinate, almost truncate, bilobed, finely tuberculate, scarcely or not at all projecting over the vertical surface; in front view slightly depressed in middle; lower margin sinuous, the tubercles tending to be obsolete. Orbits nearly filled by eyes, margins almost smooth, the superior slightly sinuous. Maxillipeds substantially as in *garmani* and *simoni*.

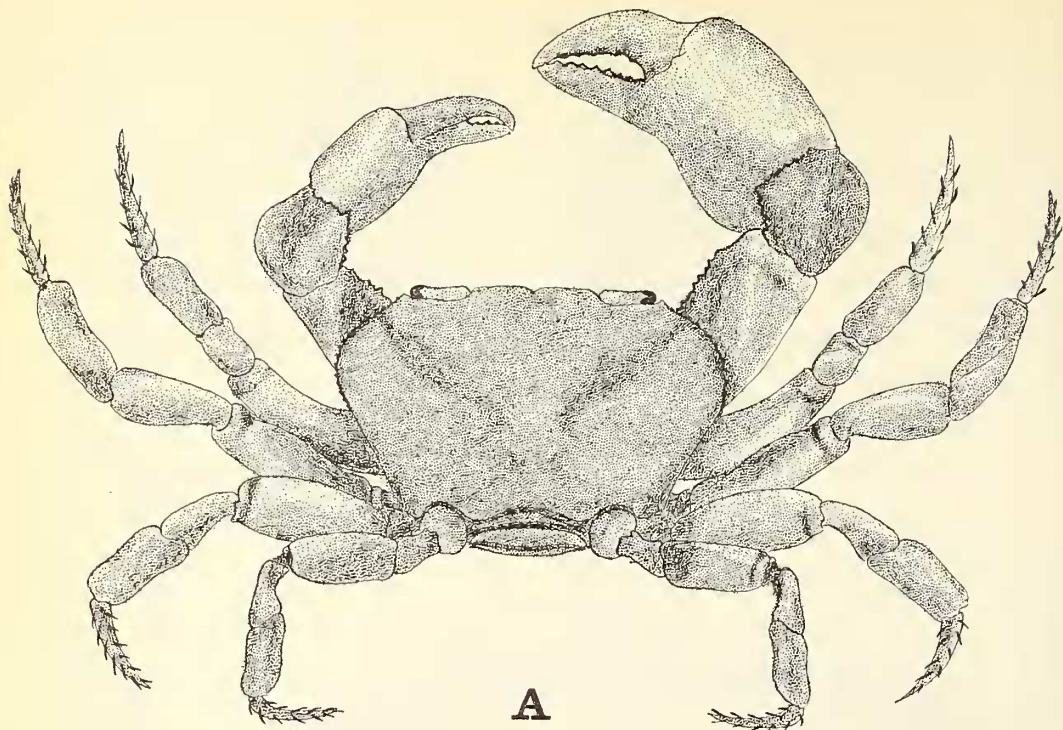
Merus of chelipeds finely rugose above, the inner margin armed with a single line of stout, graduated teeth, the lower and ventro-distal margins by beaded granules. Carpus smooth except for dorso-inner surface which is armed by a crest of small, distinct teeth, of which the usual large tooth is only one exaggerated element. Major and minor manus smooth in both sexes, save for scattered microscopic granules and punctations on outer surface and faint rugosities dorsally. Major manus, especially in male, definitely swollen; upper and lower margins in all slightly convex; sinus at base of pollex



TEXT-FIG. 2. Young crabs taken from abdominal pouches of female *Pseudothelphusa*. A, *P. garmani*, carapace, length 3.5 mm.; B, *P. chacei*, carapace, length 3.65 mm. (drawn to same scale as A); C, same, right cheliped, outer view, length 2.9 mm.

practically lacking; no tubercle at base of fingers, although there may be a very slight swelling of the margin at that point; fingers moderately broad, slightly and irregularly punctate, and near dorsal surface of dactyl, tuberculate; prehensile edges practically in contact, the teeth broad, irregular and variable. Merus of all ambulatories flattened, with upper margins convex and finely denticulate; superior margin of carpus and both margins of manus microscopically spinulose; dactyli slender and spined. Male abdominal appendage illustrated (Text-fig. 3).

Color in Life. Adults variable and capable to a certain extent of color change, the carapace ranging from a dull red to dark brown. A female with marsupial young had the cara-



TEXT-FIG. 3 [Part]. *Pseudothelphusa chacei* male holotype, length 17.5 mm. **A**, dorsal view; **B**, major cheliped, external view; **C**, right first abdominal appendage, extero-posterior view; **D**, same, extero-anterior view; **E**, same postero-internal view.

pace snuff brown (Ridgway), slightly lighter posteriorly. Chelipeds chiefly cinnamon buff to clay color with snuff brown on dorsal ridge; fingers pale buff; ambulatories snuff brown with darker segment markings. Her young were apricot buff in general coloring; front much darker, almost black; ambulatories cinnamon rufous; dorsal ridges of chelipeds apricot buff; underparts pale buff.

Measurements. Holotype male, No. 461197: Length of carapace 17.5 mm.; breadth 28.5; depth 11.5; width of front, lower margin, 7 mm.; major manus (measured along lower margin) plus pollex 26. Paratype female, No. 45105: Length of carapace 23 mm.; breadth 38.5; depth 15; width of front, lower margin, 8.4; major manus (measured along lower margin) plus pollex 30.

Development. Two females carried 22 and 40 marsupial young, respectively. An example, illustrated in Text-fig. 2B, measures 3.65 mm. long by 5.0 mm. broad. Compared with the corresponding stage of *P. garmani* the front is scarcely lobed and strongly truncate, the eyes are larger and the cheliped manus is distinctly swollen; the latter difference is carried through into the adult.

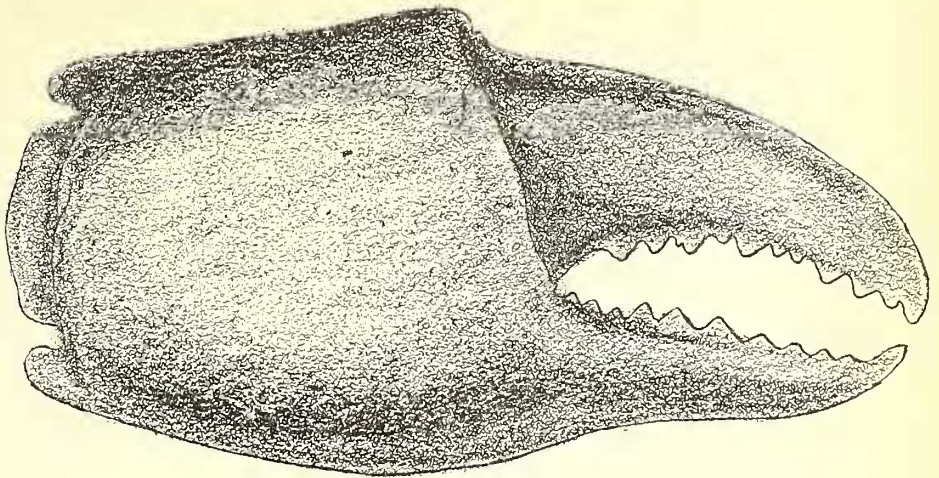
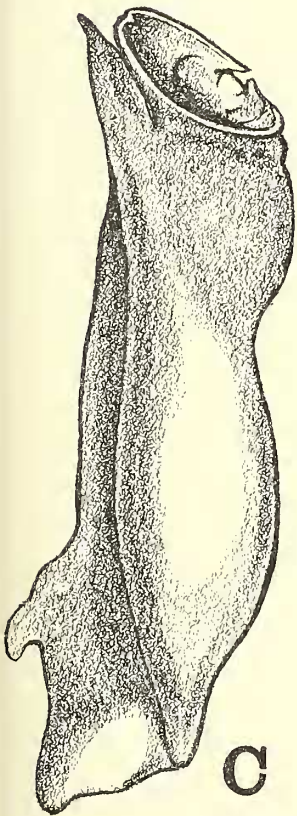
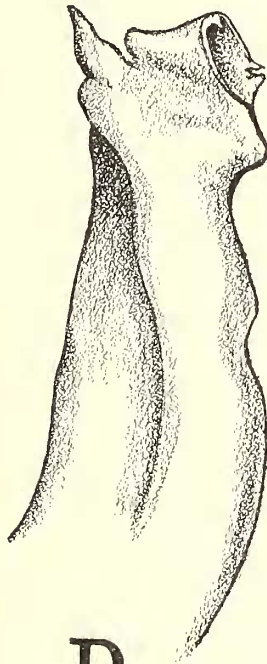
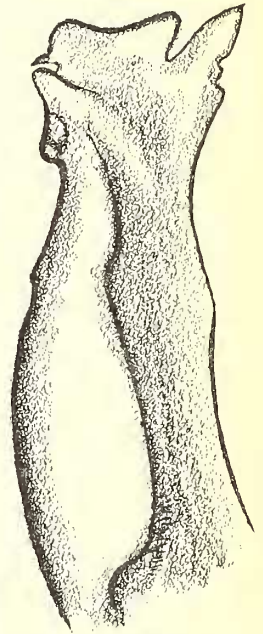
Behavior of Young. Samples of the young, when removed from one of the mothers and placed close to her, were almost helpless; they could move feebly, but did not try to climb back into the pouch; one, however, attempted to grip one of her legs as she moved slowly past.

Food. A female with young, when captured in an open patio of Rancho Grande, was holding a large, black tenebrionid beetle (D.T.R. No. 45,107) in her major chela, and pulling off the legs with her left. The beetle was uncrushed, being strong and active when liberated. Two of three stomachs examined contained black chitin, including small beetle elytra, in addition to indeterminate soft animal matter; the third was empty.

Habitat and Range. Known only from Rancho Grande, in the National Park of Aragua, Venezuela, in the montane cloud forest, between about 3,000 and 3,800 feet.

Affinities. Dr. Chace writes as follows regarding this species: "It is very close to Miss Rathbun's *P. simoni*. The male abdominal appendages agree very well with her figure of that species, but your specimens have a somewhat less convex carapace and a sharply carinate upper frontal margin which is completely lacking in *P. simoni*. The general appearance of your material would indicate full specific distinction from *P. simoni*, but the similarity in the male appendages suggests that possibly it deserves only subspecific rank." *P. simoni* is known only from the types, taken from Colonia Tovar and Caracas, Venezuela, and from the "Antilles" (Cladius).

Material. A total of 13 specimens was taken, not including marsupial young. The following have been designated as types: Holotype male, Department of Tropical Re-

**B****C****D****E**

TEXT-FIG. 3 [Part]. *Pseudothelphusa chacei* male holotype, length 17.5 mm. **A**, dorsal view; **B**, major cheliped, external view; **C**, right first abdominal appendage, extero-posterior view; **D**, same, extero-anterior view; **E**, same postero-internal view.

search Cat. No. 461197, length 17.5 mm., Rancho Grande court, March 5, 1946; paratype female, D.T.R. No. 45105, 23 mm., with 21 young, Rancho Grande court, March 29, 1945; paratype male, United States National Museum No. 87067, 17 mm., Water Trail, March 15, 1945; paratype female, U.S.N.M. No. 87067, 24 mm., Water Trail, March 7, 1945. In addition, the following were taken, all retained in the collections of the Department of Tropical Research: No. 45106, 1 female, length 22 mm., and 3 young, 7-16 mm., cloud forest, March 20-April 20, 1945; No. 4636, 1 female, length 22 mm., with 40 young, cloud forest, March 14, 1946; No. 461198, 4

young, 7-9 mm., cloud forest, March 1-15, 1946.

It gives me great pleasure to name this species for Dr. Fenner A. Chace, Jr.

REFERENCES.

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1905. Les crabes d'eau douce (Potamonidae). *Nouv. Arch. Mus. Paris*, ser. 4, Vol. 7, pp. 159-321.